FEDYNSKIY, A.V.

Use of the electronic system of the FEU-34 photomultiplier as an amplifier of weak ionic currents. Trudy TSAO no.42:92-94 '62.
(MIRA 15:12)

(Photoelectric multipliers) (Atmosphere, Upper)

KOSTKO, O.K.; FEDYNSKIY, A.V.

Pumping system for mass spectrometric analysis of the atmosphere. Trudy TSAO no.42:95-100 '62. (MIRA 15:12)
(Mass spectrometry—Equipment and supplies)
(Air—Analysis)

IVANOVSKIY, A.I.; KOSTKO, O.K.; FEDYNSKIY, A.V.

Density distribution in various devices in free molecular flow. Trudy TSAO no.46:50-62 '63. (MIRA 17:1)

KOSTKO, O.K.; FEDYNSKIY, A.V.

Damper in a pumping system for mass-spectrometric analysis.
Trudy TSAO no.46:91-95 '63. (MIRA 17:1)

L 23505-65 EWT(l)/EWT(m)/EPF(c)/EWG(v)/FCC/SEC-4/EPR/SEC(t)/EWP(t)/
EWT(b)/EWA(h) Pc-4/Pe-5/Pq-4/Pr-4/Ps-4/Pi-4/Pae-2/Peb IJP(c) JD/WS/
GW-2

ACCESSION NR: AT5001568 S/2789/64/000/056/0009/0017

AUTHOR: Sokova, N.A., Fedynskiy, A.V., Chizhov, A.F.

TITLE: An investigation of the properties of the "omegatron" in measuring the partial pressure of molecular nitrogen

SOURCE Tsentral'naya aerologicheskaya observatoriya. Trudy, no. 56, 1964. Fizika vysokikh sloyev atmosfery. Teoriya i metody issledovaniya (Physics of high atmospheric layers. Theory and methods of investigation), 9-17

TOPIC TAGS: omegatron, mass spectroscopy, high altitude mass spectroscopy, ionosphere ion pump, molecular nitrogen, nitrogen partial pressure

ABSTRACT: The characteristics of the omegatron mass spectrometer are examined experimentally with a specific view to its application as a portable device for measuring the partial pressure of molecular nitrogen in rarefied mixtures of atmospheric gases. Some aspects of omegatron compatibility with certain measuring and evacuating systems are discussed. The weight and dimensions of the omegatron have been reduced to make its use in high altitude research feasible. The dimensions of the described omegatron and its associated magnetic system are 220 x 115 x 80 mm.; the total weight is 3500

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grams. This omegatron differs additionally from that described by Chizhov (Trudy TSAO, No. 42, page 39, 1962) in the use of non-magnetic nichrome for the electrodes and the use of an additional diaphragm for adjustment of the electron beam. Optimum values of the working parameters are: $H = 2 \cdot 10^3$ gauss, accelerating voltage of the ionizing electrons 140 volts, collector voltage 0.4 volts, amplitude of the high frequency field 0.3 volts, emission current 5 ma. Resolution for masses of the order of molecular nitrogen is 7.5. Determination of the relative proportions of neon 20 and neon 22 in a gaseous mixture by measuring the ion current of the device is accurate to $\pm$ 10% to a partial neon pressure of $5 \cdot 10^{-5}$ mm. Hg, which is no worse than measurements made using a model EMU-3 amplifying electrometer. In order to make absolute measurements, the device is calibrated by measuring the ion current as a function of introduced molecular nitrogen. In order to attain the desired stability of the current as a function of pressure, particular attention has to be paid to increasing electrical insulation (to prevent leakage losses), to improving the cleanliness of the electrode surfaces (to retard gaseous sorption effects) and to using a longer warm-up period before calibration. An evaluation of the distortion introduced by using the ion pump described by Kostko and Fedynskiy (Trudy TSAO, No. 46, 1963) is made.

23505-65

ACCESSION NR: AT5001568

Comparative tables for the ion pump and oil and mercury diffusion pumps are given. It is concluded that sufficient accuracy is achieved with the ion pump for work with mass numbers of the order of molecular nitrogen. Orig. art. has: 8 figures and 2 tables.

ASSOCIATION: Tsentral'naya aerologicheskaya observatoriya (Central aerologic observatory)

SUBMITTED: 00 ENCL: 00 SUB CODE: ES, GP

NO REF SOV: 005 OTHER: 001

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L 00465-66 EWT(1)/EWA(h)/FCC GW

ACCESSION NR: AT5013409 UR/2789/65/000/061/0059/0067

AUTHOR: Fedynskiy, A. V.

TITLE: Possible method of measuring water vapor concentration at high altitudes

SOURCE: Tsentral'naya aerologicheskaya observatoriya. Trudy, no. 61, 1965. Fizika vysokikh sloyev atmosfery, teoriya i metody issledovaniya (Physics of high atmospheric layers, theory and methods of investigation), 59-67

TOPIC TAGS: water vapor, upper atmosphere, manometer, upper atmosphere water content, rarefied gas heat transfer

ABSTRACT: A method is proposed for measuring small water vapor concentrations at altitudes above 30 km, based on the change in the coefficient of heat transfer from a heated filament in the presence of negligible impurities. The instrument consists of two heat sensors (Pirani-type manometers) connected to the arms of a sensitive bridge; moist air enters one of the arms, and air passed through a drier enters the other arm. Thus, the influence of temperature and pressure on the readings of the circuit is eliminated. Since in the pressure range under consideration the heat transfer is dependent on the pressure, the authors consider the equations of heat transfer in a rarefied gas in the presence of an

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L 00465-66

ACCESSION NR: AT5013409

impurity. The energy transferred by the filament was found to depend on the impurity concentration, mass of molecule, accommodation coefficient, and heat capacity of the internal degrees-of-freedom of the impurity. In order to check the proposed method experimentally, a vacuum apparatus was constructed which made it possible to change and measure the pressure from 10^{-5} to 760 mm Hg. The measurements are fully described. Orig. art. has: 5 figures and 29 formulas.

ASSOCIATION: Tsentral'naya aerologicheskaya observatoriya (Central Aerological Observatory)

SUBMITTED: 00 ENCL: 00 SUB CODE: ES

NO REF SOV: 002 OTHER: 006

Card 2/2

MIKHEYEV, M.A.; BAUM, V.A.; VOSKRESENSKIY, K.D.; FEDYNSKIY, O.S.

[Heat transfer in melted metals] Teplootdacha rasplavlennykh metallov. Moskva, 1955. 13 p. (MIRA 14:7)
(Heat—Transmission)

FEDYNSKIY, O S

124-11-12810

Translation from: Referativnyy Zhurnal, Mekhanika, 1957, Nr. 11, p. 72 (USSR)

AUTHOR: Mikheyev, M. A., Baum, V. A., Voskresenskiy, K. D., Fedynskiy, O. S.

TITLE: Heat Transfer by Molten Metals. (Teplootdacha rasplavlennykh metallov)

PERIODICAL: V sb.: Reaktorostroyeniye i teoriya reaktorov. Moscow, Izd-vo AN SSSR, 1955, pp 139-151 (Also, in English, Progr. Nuclear Energy, 1956, Ser. 4, No. I, pp 223-232)

ABSTRACT: Contains fundamental information of experimental installations, measuring techniques, and testing methods.

Investigated was the heat transfer by mercury, tin, lead, bismuth, sodium, and bismuth-lead and sodium-potassium alloys.

The flow velocities varied from 0.1 to 20 m/sec, the Reynolds number from 1×10^4 to 6.5×10^5, the Prandtl number from 4×10^{-3} to 3.2×10^{-2}, and the specific heat flux from 2×10^4 to 1×10^6 kg-cal/m^2.hr.

The Authors offer criteria for pure and oxidized surfaces based on 600 test points.

A comparison is made between the test data and existing theories.

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Heat transfer by molten metals (continued).

From an evaluation of a variety of test data a new criterion is proposed in the form of a formula which applies to molten metals as well as to "common" liquids in which the Prandtl number exceeds 0.7.

Investigations were also performed on the heat transfer in conditions of natural convection on heated plates and tubes for heavy and alkaline molten metals and their alloys.

As a result of the evaluation of the test material, and also from available data on liquids exhibiting low heat conductivity, the Authors submit a single criterion formula for the heat transfer in large volumes, applicable over a wide range of Grashof and Prandtl numbers.

The data relative to the hydrodynamic resistance in the flow of liquid metals show that the general formulas of hydrodynamics are applicable.

(V. N. Krylov)

PHASE I BOOK EXPLOITATION 775

Kutateladze, S.S., Borishanskiy, V.M., Novikov, Ivan Ivanovich, and Fedynskiy, O.S.

Zhidkometallicheskiye teplonositeli (Liquid Metal Heat-Transfer Agents) Moscow, Atomizdat, 1958. 204 p. (Series: Atomnaya energiya. Prilozheniye, 1958, no 2) 8,750 copies printed.

Resp. Ed.: Koryakin, Yu. I.; Tech. Ed.: Usachev, G.L.

PURPOSE: This book is intended for scientists and engineers working in the field of reactor construction and nuclear engineering. It can also be useful in other fields where liquid metal heat-transfer agents are applicable.

COVERAGE: This booklet, a 1958 supplement to the periodical "Atomic Energy," is devoted to a study of liquid metal heat-transfer agents used in nuclear power engineering. The authors present data from Soviet and foreign research in this field conducted within the last 10 years. The greater part of the

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text was written by S.S. Kutateladze, V.M. Borishanskiy, and I.I. Novikov. Chapters I, III, V, and VIII were written in collaboration with O.S. Fedynskiy. G.M. Lyamkin, N.A. Prikhodchenko and Yu. I. Koryakin took part in preparing the manuscript. There are 81 references of which 40 are Soviet, 32 English, 5 German, and 4 French .

TABLE OF CONTENTS:

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., Novikov, I. I., Fedynskiy, O. S. SOV/89S-58-2-1/13

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli) Chapter 1:* Basic Properties of Liquid Metals (Glava 1. Osnovnyye svoystva zhidkikh metallov)

PERIODICAL: Atomnaya energiya, 1958, Supplement 2, pp. 7-22** (USSR)

ABSTRACT: The physical properties are given in form of tables for the liquid state of the following elements:
1.) Mercury
2.) Sodium
3.) Kalium
4.) Lithium
5.) Bismuth
6.) Gallium
7.) Lead.
The theory of the thermodynamical similitude of real bodies is explained and applied to the investigation of the properties of liquid metals. This chapter further deals with the following subjects: Experimental data concerning the velocity of propagation

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* Chapters 1-13:
** Atomnaya energiya: 1958 Supplement 2, Pages 2-202 (USSR)

of sound in liquid metals, and a method of estimating this quantity by calculation.
This and the following chapters take data published within the past 10 years into account both in the USSR and in other countries.
The entire compilation was signed by S. S. Kutateladze, V. M. Borishanskiy and I. I. Novikov, as the responsible authors.
O. S. Fedynskiy participated in compiling chapters 1, 3, 5 and 8.
G. M. Lyamkin, N. A. Prikhodchenko and Yu. J. Koryakin assisted in writing the manuscript. There are 3 figures, 12 tables.

1. Liquid metals--Properties 2. Liquid metals--Sound transmission

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., Novikov, I. I., Fedynskiy, O. S. SOV/89S-58-2-2/13

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli) Chapter 2: Ranges of Application of Liquid Metal Heat Carriers (Glava 2.Oblasti primeneniya zhidkometallicheskikh teplonositeley)

PERIODICAL: Atomnaya energiya, 1958, Supplement 2, pp. 23-26 (USSR)

ABSTRACT: The following subdivision offers a survey of the various ranges of application:
a) General considerations.
b) Use of liquid metal heat carriers in steam-producing plants.
c) The use of liquid metal heat carriers in nuclear power plants.
There are 1 figure.

1. Liquid metals--Applications 2. Liquid metals--Heat transfer

Card 1/1

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., Novikov, I. I., Fedynskiy, O. S. SOV/89S-58-2-3/13

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli) Chapter 3: The Hydraulic Resistance of Flowing Liquid Metals (Glava 3. Gidravlicheskoye soprotivleniye pri techenii zhidkikh metallov)

PERIODICAL: Atomnaya energiya, 1958, Supplement 2, pp. 27-37 (USSR)

ABSTRACT: The following subdivisions offer a survey of the matter dealt with:
1.) Flow in smooth tubes.
Investigations showed that the laws of resistance for flowing liquid metals in smooth tubes are practically the same as in the case of non-metal liquids.
2.) Flow in rough tubes.
The hydraulic resistance of steel tubes to H_2O, Hg and Sn is graphically represented.
3.) Influence exercised by the heat carrier.
4.) Local resistance.
5.) Friction of a revolving disk.
The consumption of energy necessary for the rotation of a

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Liquid Metal Heat Carriers.
Chapter 3: The Hydraulic Resistance of Flowing Liquid Metals

SOV/89S-58-2-3/13

smooth disk of 270 mm Ø and 10 mm thickness in Hg, oil. H_2O and petroleum is shown by a graph.
6.) Increase of prussure in the case of a hydraulic impact.
There are 10 figures.

1. Liquid metals--Hydrodynamic characteristics
2. Fluid flow--Resistance 3. Friction

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AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., Novikov, I. I., Fedynskiy, O. S. SOV/89S-58-2-5/13

TITLE: Liquid Metal Heat Carriers (Zhidkometallicheskiye teplonositeli) Chapter 5: Heat Transfer in Flows Through Tubes (Glava 5. Teplootdacha pri techenii v trubkakh)

PERIODICAL: Atomnaya energiya, 1958, Supplement 2, pp. 47-95 (USSR)

ABSTRACT: The following subdivision allows a survey of this matter:
a) Theoretical solutions.
b) Experimental data concerning the heat transfer to mercury.
c) Experimental data concerning the heat transfer to the eutectic lead-bismuth.
d) Experimental data concerning the heat transfer to tin.
e) Experimental data concerning the heat transfer to the eutectic sodium-kalium.
f) Comparison of the empirical values obtained concerning the average heat transfer in tubes with L/D > 30 for:
1.) mercury
2.) sodium
3.) eutectic: sodium-kalium
4.) influence exercised by additions.

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Liquid Metal Heat Carriers.
Chapter 5: Heat Transfer in Flows Through Tubes

SOV/893-58-2-5/13

g) Comparison of empirical values obtained concerning the heat transfer in slit.

There are 67 figures, 1 table.

1. Liquid metals--Heat transfer

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SOV/898-58-5-4/4

AUTHORS: Kutateladze, S. S., Borishanskiy, V. M., Novikov, I. I., Fedynskiy, O. S.

TITLE: Supplementary Table: "Liquid Metallic Heat Carriers"(Prilozheniya: Zhidkometallicheskiye teplonositeli)

PERIODICAL: Atomnaya energiya, 1958, Supplement 5, Inserted Between pp 108 and 109 (USSR)

ABSTRACT: This is a supplement to table 12.1 (pp 172-173) and the explanation of the positions 1 - 33 on the drawing 12.1 (pp 177) in connection with the paper published in Atomnaya energiya, 1958, Supplement Nr 2. The table contains data on physical properties of metallic heat carriers. There is 1 table.

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Fedynskiy, O.S.

24(8) PHASE I BOOK EXPLOITATION SOV/3501

Akademiya nauk SSSR. Energeticheskiy institut

Voprosy teploobmena (Heat-Exchange Problems) Moscow, 1959. 237 p. Errata slip inserted. 2,800 copies printed.

Resp. Ed.: M.A. Mikheyev, Academician; Ed. of Publishing House: G.B. Gorshkov; Tech. Ed.: I.F. Kuz'min.

PURPOSE: This collection of articles is intended for scientific workers, engineers, and postgraduate students specializing in thermodynamics.

COVERAGE: The collection reviews problems of heat transfer and explores possibilities of intensifing heat exchange. The heat exchange theory is outlined, and Russian scientists who contributed to its development are mentioned. Thermophysical properties of some molten metals and alloys are analyzed, and methods used to determine them presented. Equipment used for measuring thermal conductivity, heat capacity, and kinetic viscosity of these metals are discussed. Results of experimental study of the intensified heat exchange for a water flow in an annular channel are analyzed and the instruments used along with the pilot plant for studying convection heat exchange in contacting nonmiscible fluids are described. Instruments and equipment used for determining the linear expansion of metals, the consumption of a liquid, and the absorption capacity of a surface are also described and illustrated. A number of equations for solving various thermodynamic problems are presented. Each article is accompanied by references, the majority of which are Soviet.

TABLE OF CONTENTS:

24(8) PHASE I BOOK EXPLOITATION SOV/1826

Akademiya nauk SSSR. Energeticheskiy institut

Teploperedacha i teplovoye modelirovaniye (Heat Transfer and Modeling of Heat Processes) Moscow, Izd-vo AN SSSR, 1959. 419 p. Errata slip inserted. 3,500 copies printed.

Resp. Ed.: M. A. Mikheyev, Academician; Ed. of Publishing House: D. A. Ivanova; Tech. Ed.: G. N. Shevchenko.

PURPOSE: The book is intended for scientists concerned with heat transfer, heat emission, and hydraulics of liquid metals, etc.

COVERAGE: This collection is dedicated to the memory of Academician M. V. Kirpichev who in the twenties initiated a systematic investigation of heat transfer processes and the efficiency of heat apparatus. Later he led the development of research work in this field. Two special collections devoted to works of Kirpichev's school have been published, one in 1938, Materialy soveshchaniya po modelirovaniya (Materials of the Conference on Modeling) and in 1951, Teoriya podobiya i modelirovaniye (Theory of Similitude and Modeling). The present collection prepared in 1956 represents further development of the work of this school. This theory is fundamental for the analysis of many heat problems in the field of electrical and radio engineering. Of great importance are the first systematic investigations of heat transfer and the hydraulics of liquid metals which as a new kind of heat carrier may be used in the various branches of modern engineering. As a result of special investigations of some cases of convective heat transfer, a dependence of the process on the kind of liquid, temperature, pressure, direction of the heat flow, and other factors, was discovered and established. On the basis of a wide generalization of experimental data, new dependable recommendations for heat analysis of engineering equipment were developed. Of no less interest is the work on heat transmission in boiling liquids and the condensation of vapors. All investigations are based on the theory of similitude, the nature of which, according to M. V. Kirpichev, is that of "experimentation." Work on the theory of a regular regime applied to a system of bodies with an internal source of heat is of interest for the future.

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Mikheyev, M. A., O. S. Fedynskiy, V. M. Darvugin, V. I. Petrov.
Heat Emission in the Flow of Metals in Pipes 69

This article gives results of the first most complete investigation of average heat emission in a turbulent flow of liquid metals through straight pipes. Supplementing the report of the International Conference on the Peaceful Use of Atomic Energy, this article provides more complete tables of values and descriptions of experiments. N. A. Vel'tishchev, A. V. Osipov, and G. M. Chizhevskaya cooperated with the authors in conducting experiments; N. A. Nikol'skiy, T. V. Klassen, A. N. Solov'yev, K. A. Kalakutskaya, and I. M. Pchelkin with the cooperation of V. A. Vel'tishcheva determined the physical properties of metals; data on the viscosity of lead, mercury, and sodium are taken from the works of Khalilov, Shvidkovskiy, and Chiong. There are 8 references: 4 Soviet, and 4 English.

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24(8) PHASE I BOOK EXPLOITATION SOV/1826

Akademiya nauk SSSR. Energeticheskiy institut

Teploperedacha i teplovoye modelirovaniye (Heat Transfer and Modeling of Heat Processes) Moscow, Izd-vo AN SSSR, 1959. 419 p. Errata slip inserted. 3,500 copies printed.

Resp. Ed.: M. A. Mikheyev, Academician; Ed. of Publishing House: D. A. Ivanova; Tech. Ed.: G. N. Shevchenko.

PURPOSE: The book is intended for scientists concerned with heat transfer, heat emission, and hydraulics of liquid metals, etc.

COVERAGE: This collection is dedicated to the memory of Academician M. V. Kirpichev who in the twenties initiated a systematic investigation of heat transfer processes and the efficiency of heat apparatus. Later he led the development of research work in this field. Two special collections devoted to works of Kirpichev's school have been published, one in 1938, Materialy soveshchaniya po modelirovaniyu (Materials of the Conference on Modeling) and in 1951, Teoriya podobiya i modelirovaniye (Theory of Similitude and Modeling). The present collection prepared in 1956 represents further development of the work of this school. This theory is fundamental for the analysis of many heat problems in the field of electrical and radio engineering. Of great importance are the first systematic investigations of heat transfer and the hydraulics of liquid metals which as a new kind of heat carrier may be used in the various branches of modern engineering. As a result of special investigations of some cases of convective heat transfer, a dependence of the process on the kind of liquid, temperature, pressure, direction of the heat flow, and other factors, was discovered and established. On the basis of a wide generalization of experimental data, new dependable recommendations for heat analysis of engineering equipment were developed. Of no less interest is the work on heat transmission in boiling liquids and the condensation of vapors. All investigations are based on the theory of similitude, the nature of which, according to M. V. Kirpichev, is that of "experimentation." Work on the theory of a regular regime applied to a system of bodies with an internal source of heat is of interest for the future.

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Pedynskiy, O. S. Influence of Thermophysical Properties of Heat Carriers on Heat Transfer in Natural Convection 107

The expression of the Nusselt (Nu) number is given as a function of Grashof (Gr) and Prandtl (Pr) numbers for the case of small inertia forces and small viscosity forces in free flows. These functional dependences are discussed and presented in the form of criterional relations in which the index of the degree at criterion Pr is a changing quantity depending on physical properties of the liquid n=f(Pr), and the criterion Gr determines the hydrodynamics of the flow of the heat carrier moving in the result of the action of lifting

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forces. In the generalization of experimental data on heat transfer in a free flow of liquids, testing results are usually presented in the form of relations between similarity criteria. The experiments of M. V. Kirpichev and M. A. Mikheyev established that in the investigated interval of values $(Gr\,Pr)_m$ in general, laminar conditions of a free flow of the fluid exist and to which corresponds the law of heat transfer ¼ degree (Lorenz law). Heat transfer in free flow of melted metals is covered in a supplement to this article. There are 12 references: 8 Soviet, 3 German, and 1 English.

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24,5200
21 (9), 10 (4)

S/170/59/002/12/001/021
B014/B014

AUTHORS: Deryugin, V. M., Fedynskiy, O. S.

TITLE: Heat Transfer in the Transition Flow of Liquid Metals in Tubes

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Vol 2, Nr.12, pp 3 - 10 (USSR)

ABSTRACT: The experiments described were carried out at the Laboratoriya teploobmena Energeticheskogo instituta AN SSSR (Laboratory for Heat Exchange of the Institute of Power Engineering of the AS USSR) with the assistance of G. M. Chizhevskaya, student of engineering, the technician L. I. Kochetkova, and the mechanic A. V. Belyakov. The experimental setup shown in figure 1 is used to study the unsteadiness of motion of the heat carrier, which is caused by the conditions at the inlet, primary turbulence, the condition of the surface, etc. The delivery of the heat carrier, its temperature in front of and behind the heat exchanger, the temperature of the walls of the heat exchanger over its entire length, and the electric power of the heater were measured in these experiments. The mean heat-exchange coefficient was determined by means of thermocouples arranged on the walls of the exchanger. The temperature of the heat carrier was assumed to be the arithmetic mean of its temperatures

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Heat Transfer in the Transition Flow of Liquid Metals in Tubes

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B014/B014

in front of and behind the heat exchanger. Visual checking of the inner surface of the tubes after the experiments showed that tubes of stainless steel are not wetted by mercury. A thin layer is, however, applied to the inner surface of nickel tubes by a eutectic potassium - sodium alloy. This layer could not be removed by mechanical means. Results of measuring the mean heat-exchange coefficient are diagrammatically shown in figure 2 for the case in which mercury flows through a straight tube of stainless steel. This diagram indicates that during the transition of a turbulent flow to a laminar one, heat emission is continuously reduced. In the case of the potassium - sodium alloy it is shown that the heat emission of the alloy is considerably changed within the range of critical flow. This change is ascribed to the wetting power of the alloy. Equation (1) is used to estimate the heat-exchange coefficient of non-wetting liquid metals, and equation (2) is given for wetting liquid metals. This article is concluded with a discussion of the two nomograms shown in figure 4, which are used to calculate the local heat-exchange coefficient of wetting and non-wetting metals. There are 4 figures and 4 Soviet references.

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Heat Transfer in the Transition Flow of Liquid Metals in Tubes

S/170/59/002/12/001/021
B014/B014

ASSOCIATION: Energeticheskiy institut im. G. M. Krzhizhanovskogo, g. Moskva (Institute of Power Engineering imeni G. M. Krzhizhanovskiy, City of Moscow)

Card 3/3

24.5200 (1498)
26.2221

27407
S/089/61/011/003/009/013
B102/B138

AUTHORS: Astakhov, O. P., Petrov, V. I., Fedynskiy, O. S.

TITLE: Thermal contact resistance in the case of heat withdrawal to liquid metals

PERIODICAL: Atomnaya energiya, v. 11, no. 3, 1961, 255-257

TEXT: The heat-transfer theory by Martinelly - Lyon (R. Lycn, Chem. Engng. Progr. 47, no. 2, 75, 1951) has only been confirmed experimentally for the case of large tube diameters. Tube diameters < 10 mm yield values which refute this theory. The discrepancy between experiment and theory is said to be due to the neglect of thermal contact resistance at the interface wall - liquid metal. The present "Letter to the Editor" offers a theoretical study of the effect of this contact resistance R' (in $m^2 hr^{\circ}C/kcal$) on the relationship between the measured heat-transfer coefficient α and the theoretical heat-transfer coefficient α_o. $1/\alpha = 1/\alpha_o + R'$; $\alpha/\alpha_o = Nu/Nu_o = 1/(1 + R'\lambda_{liq} Nu_o/d)$; λ_{liq} = heat conduction coefficient of the liquid metal, d = inner tube diameter; Nu is the Nusselt number; the

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Thermal contact resistance in the...

subscript o denotes the quantities calculated according to the Martinelly - Lyon theory. It follows that experimental results obtained for tube diameter d cannot be used for calculating the heat transfer in another case, where the tube diameter differs from d, since R' depends both on d and the flow rate. The argument is developed to show that agreement between experiment and theory can only be achieved for wide tubes. The quantity $(R'\lambda_{liq}/d)$ is the determinative parameter of heat transfer, which allows for thermal contact potential. Conditions are illustrated by a practical example. For d = 24 mm ($Re > 10^4$), $Nu/Nu_o \approx 0.95$, and the contact resistance value is estimated as $R' = 2.13 \cdot 10^{-6}$ $m^2 hr^oC/kcal$, which is in good agreement with experimental data. If, however, d = 3 mm, then $Nu/Nu_o = 0.703$, which means that the divergence from theory is as high as 30 %. To study R' as a function of flow rate, a practical example is again considered: d = 8.6 mm (copper tube), $t_{liq.Na} = 240^oC$, $Nu = 5.9 + 0.015\ Pe^{0.8}$, $Nu/Nu_o = 0.75$, $\lambda_{liq} = 68$ kcal/m.hr°C. This yields: $R' = 4.22 \cdot 10^{-5}/Nu_o$ (Pe); Pe = 200 - 1400. In this range, R' was only slightly dependent on flow rate w, as illustrated

Thermal contact resistance in the...

by curve 1 where R'(w) is shown at d = const. Curve 2 shows α/α_o as a function of d taking account of R'(w). Agreement between experiment and theory is found with the Peltier numbers mentioned, i.e., d must be somewhat larger than 20 mm. It is finally suggested for a better confrontation between experiment and theory that experimental results be represented in $Nu^{-1}(Pe)$ diagrams instead of Nu(Pe) diagrams. The dimensionless representation $R'\lambda_{liq}/d = 1/Nu - 1/Nu_o$ also proved to be expedient. There are 1 figure and 14 references: 8 Soviet and 6 non-Soviet. The four most recent references to English-language publications read as follows: Ref. 9: B. Lubarsky, S. Kaufmann. Review of Experimental Investigations of Liquid Metal Heat Transfer. NACA, Report 1270, 1956; Ref. 12: H. Brown, B. Amstead, B. Short. Trans. ASME, 79, No. 2 (1957); Ref. 13: S. Isakoff, T. Drew. General Discussion on Heat Transfer. London Conference, 1951, p. 405; Ref. 14: M. Jacob. Heat Transfer, v. 11, N.-Y., John Wiley a. Sons, Inc. 1957, p. 504.

SUBMITTED: March 12, 1961

Card 3/4
3

ACC NR: AP6025058 SOURCE CODE: UR/0281/66/000/002/0136/0144

AUTHOR: Alad'yev, I. T. (Moscow); Gorlov, I. G. (Moscow); Dodonov, L. D. (Moscow); Korolev, V. S. (Moscow); Fedynskiy, O. S. (Moscow)

ORG: none

TITLE: Critical heat flows and heat emission with potassium boiling in pipes

SOURCE: AN SSSR. Izvestiya. Energetika i transport, no. 2, 1966, 136-144

TOPIC TAGS: potassium, heat flow, pipe flow, physical property, liquid

ABSTRACT: The authors discuss the results of experimental studies into critical heat flows and heat emission with flowing potassium boiled in tubes under pressures of 1.1--1.3 bar. This research was conducted at ENIN im. G. M. Krzhizhanovskiy in the period from 1960 to 1964. Two identical test facilities were used for these studies, and consisted of a closed-loop circulatory system with tubing made of 1Kh18N9T stainless steel. The potassium was circulated by means of an electromagnetic pump, with discharge measured by an electromagnetic flowmeter, systematically calibrated against a volumetric flowmeter. A block diagram of the test rig is shown in Fig. 1. Test methodology and result processing techniques are discussed. Preliminary argon blow-through of the system was employed, and the commercial potassium employed (TU No. 2010 55) had a melting temperature of 333.6 K. It is found that: 1) the general laws governing critical heat flows and heat emission for boiling potassium are the same as

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ACC NR: AP6025058

Diagram of test set up: 1 - overflow reservoir, 2 - system reservoir, 3 - electromagnetic pump, 4 - electromagnetic flowmeter, 5 - primary heating element, 6 - auxiliary heating element, 7 - experimental section, 8 - protective covering, 9 - cooling unit, 10 - diffusion trap, 11 - variable level tank, 12 - volumetric flow-meter, 13 - reticulate filter, 14 - control valve, 15 - stopper valve, 16 - cold trap, 17 - analysis sampling, 18 - (air) valve

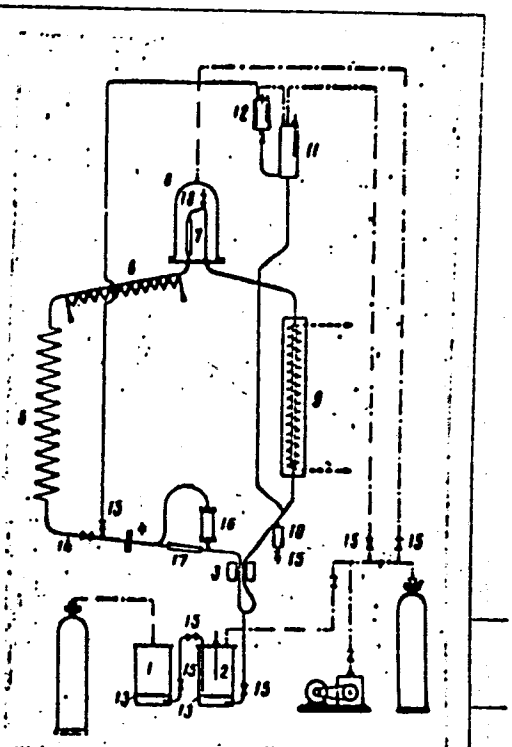

Figure 1.

for conventional liquids used as heating surface wetting agents; 2) critical heat flows for potassium at p_s=1 - 2 bar, K = 1 - 1.5, and x_{in} <0 are described by the equation

$$q_{cr} = 0.4\, w\rho^{0.8}\, \frac{1 + 5.10^{-4}\Delta t_{heat}}{(l/d)^{0.8}}\, \frac{mw}{m^2}$$

which is valid in the parameter range studies; and

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ACC NR: AP6025058

3) heat emission with intensive boiling of potassium in tubes of molybdenum and stainless steel, in the parameter range studied, can be described by the equation

$$\alpha = 3.2q^{0.7}\ W/m^2\ deg.$$

SUB CODE: 20, 11/ SUBM DATE: 14Jul65/ ORIG REF: 008/ OTH REF: 005

Card 3/3

FEDYNSKIY, V.I.

26172 Fedynskiy, V.I. Vsesoyuznaya Nauchnaya Konferentsiya Po Ozeleneniyu Gorodov. (Moskva. Mart 1948 g.) Vrachebn. Delo, 1948, No16, Stb. 553-55.

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1328. **Protective Afforestation and Radiation Temperatures.** (Полезащитные лесонасаждения и радиационные температуры)

V. I. FEDYNSKIJ. Гигиена и Санитария [*Gigiena*] No. 1, 15–19, Jan., 1950.

Protective afforestation and its influence on radiation temperature, on the winds, on humidity of the air, and on human sensations of comfort were investigated.

It was found that afforestation makes the fall and rise of air temperature more even and more smooth. If appropriately directed and planned, afforestation protects the nearby land against the severity of the winds. Humidity is retained by afforestation, which thus protects the nearby land against drought.

These observations were combined with the assessment of comfort experienced by the observer. It appears that afforestation is to be strongly recommended wherever comfort of the community is a desideratum.

Abstr^cts of World Medicine
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614.79 / (016.3)

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1. LINITSKIY, N.V. TERESHKO, D.L. FEDYNSKIY, V.V.

2. USSR (600)

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USSR/Physics
Astronomy

Jul 47

"Destructive Action of Meteorite Blows," K. P. Stanyukovich, V. V. Fedynskiy, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVII, No 2

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PA 60T102

Translation 563375

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Iz. Ak. Nauk SSSR, Ser. Geograf. i Geofiz., No. 2, 1945.

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AFC
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Summary of the basic work which has been done in the field of Soviet gravimetry from 1917 to 1947. The authors state that although this science has been in existence for quite some time, it was not until the past ten years that any remarkable work was accomplished in this field. The article, among other data, mentions the fact that there are some 15,000 gravimetric posts in the Soviet Union at the present time. TID

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SO: Vechernyaya Moskva, Jun, 1947 (Project #17836)

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USSR/Astronomy - Astronomers Jul/Aug 52

"Fourth Plenum of the Commission on Comets and Meteors and the Commission on Planetoids of the Astronomical Council of the Academy of Sciences USSR," K. Stanuykovich, V. Fedzynskiy

"Astron Zhur" Vol 29, No 4, pp 505-508

A meeting of the Commission on Comets and Meteors and the Commission on Asteroids was held 6 - 8 Dec 51 in Kiev. Thirty representatives of astronomical observatories attended. Prof V. V. Fedynskiy, Pres, Commission on Comets and

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Meteors, opened the session. The main subject was S. K. Vsekhsvyatskiy's theory on the origin of comets as eruptions from planets. His theory met strong criticism.

226T48

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The design of the instrument is described and the price of the micrometer calibration and of barometric indicators is evaluated. Photographs of the operating of the instrument are included.
SO: Sum. No. 443, 5 Apr 55

FEDYNSKIY, V. V.

USSR/Astronomy - Meteors Jan/Feb 53

"Augmented Session of Office of Commission on Meteors and Comets at the Astronomical Council of Acad Sci USSR," V.V. Fedynskiy

"Astron Zhur" Vol 30, No 1, pp 115, 116

14 members of commission and guests from Moscow, Leningrad, Kiev, Ashkhabad, Stalinabad, L'vov, Kuybyshev, Sverdlovsk and Simferopol' attended. Discussions are described and names of attending scientists given.

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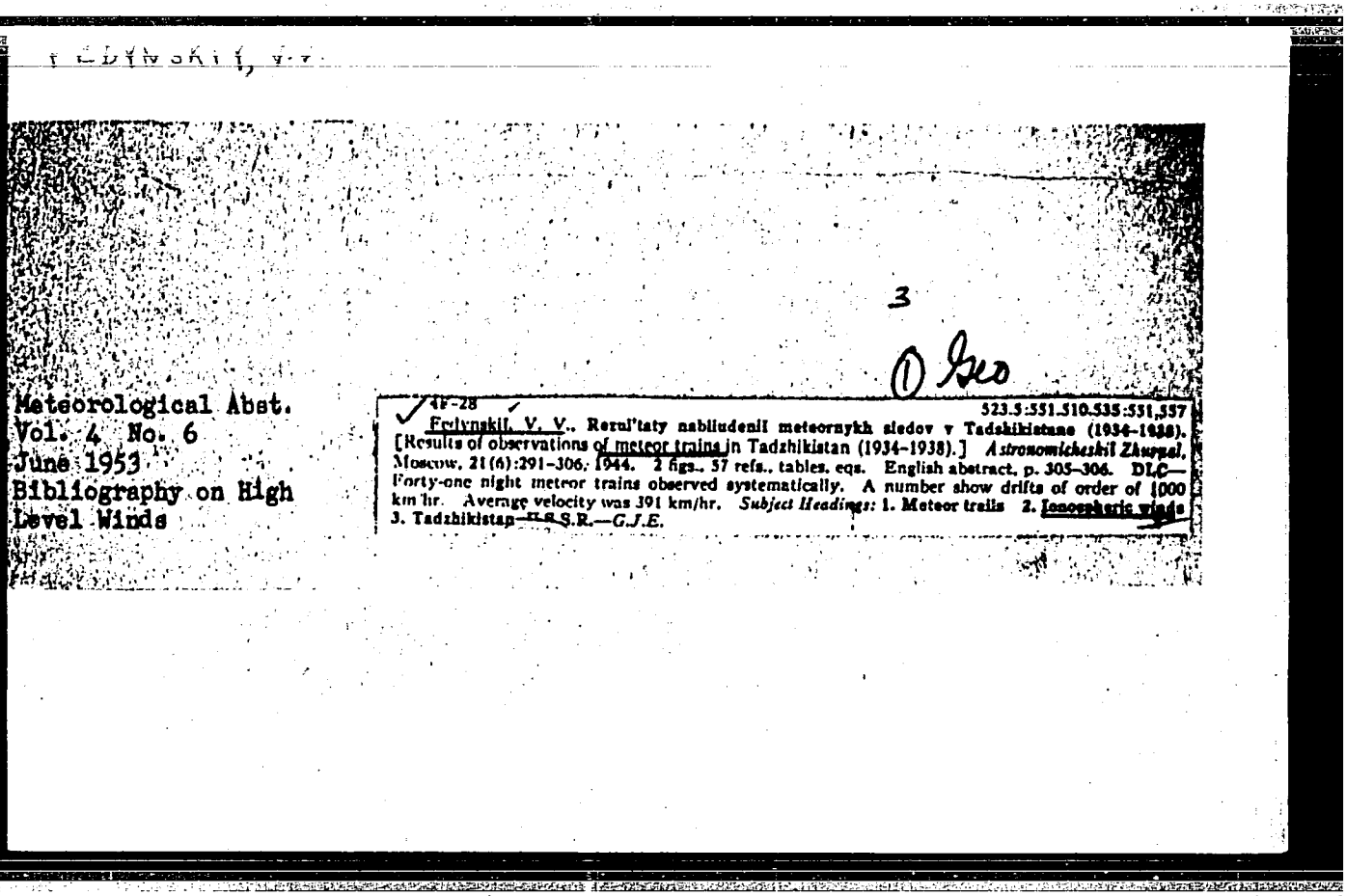
TRANSLATION SUBMITTED



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Vol. 4 No. 6
June 1953
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So: D407195
A - 50226, 27 June 55

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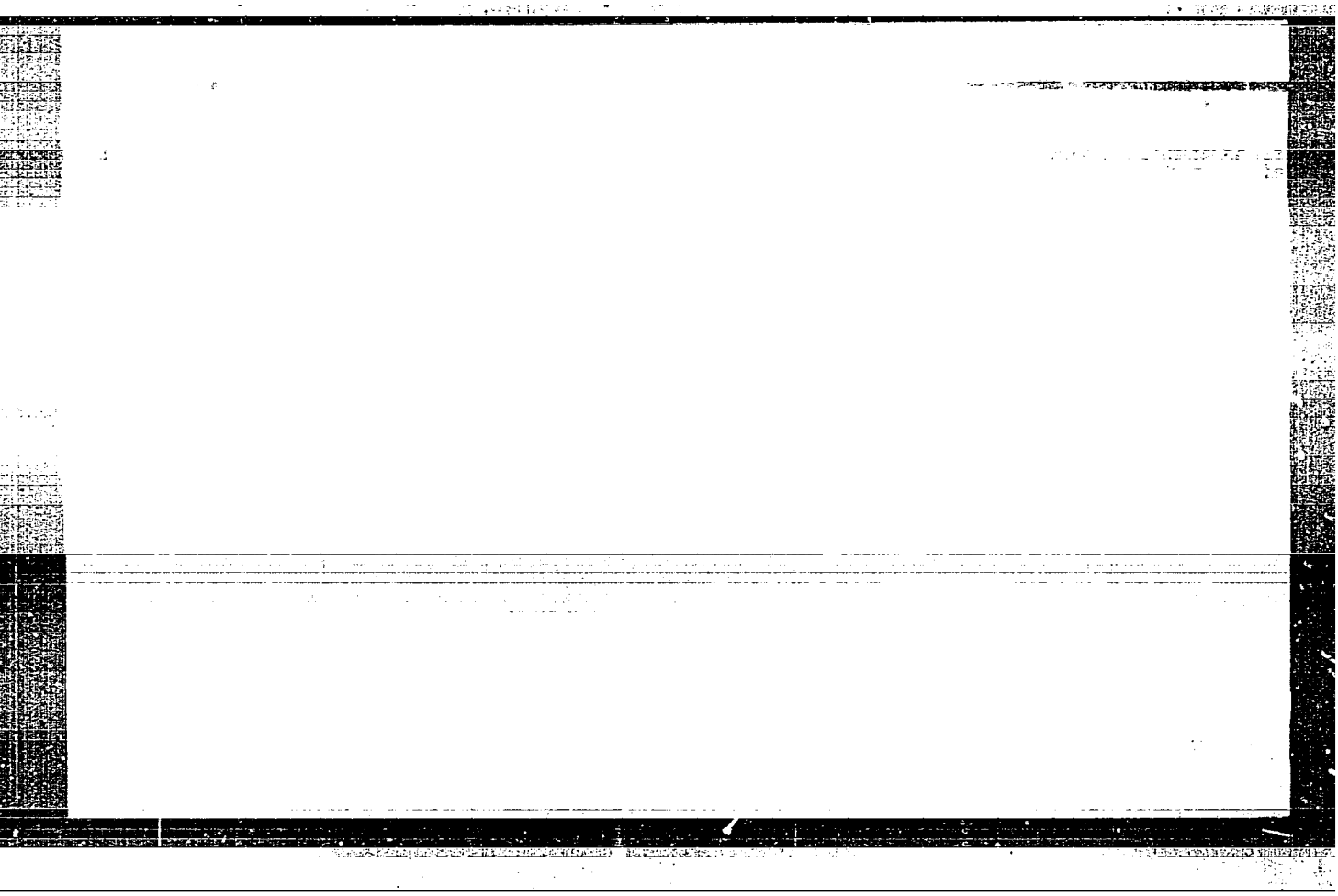

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SO: Sum-No 787, 12 Jan 56

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(Meteors)

AID P - 3064

Subject : USSR/Mining

Card 1/1 Pub. 78 - 18/20

Authors : Trebin, F. A., A. A. Trofimuk and V. V. Fedynskiy

Title : The fourth International Petroleum Congress in Rome

Periodical : Neft. khoz., v. 33, no. 8, 86-93, Ag 1955

Abstract : Three members of the Soviet delegation to the Fourth International Petroleum Congress held in June 1955 in Rome, Italy outline the work of the Congress and the papers presented with special emphasis on Soviet participation.

Institution : None

Submitted : No date

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(Prospecting--Geophysical methods) (Petroleum--Refining)
(Gas, Natural)

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GEYMAN, M.A., redaktor; TOPCHIYEV, A.V, akademik, redaktor; TROFIMUK, A.A., redaktor; FEDYNSKIY, V.V., doktor fiziko-matematicheskikh nauk, redaktor; SUKHANOV, V.P., inzhener, redaktor; TREBIN, F.A., doktor tekhnicheskikh nauk; redaktor; BEKMAN, Yu. K., vedushchiy redaktor; KOVALEVA, A.A., vedushchiy redaktor; NIKITENKO, A.A., vedushchiy redaktor; PERSHINA, Ye. G., vedushchiy redaktor; PETROVA, Ye. A., vedushchiy redaktor; SAVINA, Z.A., vedushchiy redaktor; POLOSINA, A.S., tekhnicheskiy redaktor

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(Oil well drilling) (Petroleum engineering) (Gas, Natural)

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Geology and geophysics of petroleum at the Fourth International Petroleum Congress. Priroda 45 no.3:52-57 Mr '56. (MLRA 9:7)
(Rome--Petroleum--Congresses) (Petroleum geology)

FEDYNSKIY, V.V.

Category : USSR/Radiophysics - Application of radiophysical methods I-12

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1993

Author : Fedynskiy, V.V.
Title : Radio Methods for the Study of Meteors.

Orig Pub : Tr. 5-go soveshchaniya po vopr. kosmogonii. 1955, M., AN SSSR, 1956, 356-387 diskus. 387-388

Abstract : A survey article, devoted to a description of experimental radio methods for the investigation of meteors, and to the results obtained in this manner. The most urgent present-day problems of meteor radio astronomy are the following: 1) extension of the frequency range of the presently-used radar systems toward the longer waves, so as to permit study of the connection between meteor ionization and the sporadic E layer; 2) prolonged all-inclusive observation of the meteors for the purpose of studying the laws relating the brightness and mass of the meteors with the ionization produced by the meteors; 3) systematic study of the upper layer of the atmosphere by radar methods; 4) systematic observation of the drift of meteor tracks and turbulent motion in the upper layers of the atmosphere; 5) study of the daily and seasonal variations of the physical state of the atmosphere; 6) study of the orbits and of the distribution of the meteor bodies for streams and sporadic meteors.

Card : 1/1

Fedynskiy, V.V.

PHASE I BOOK EXPLOITATION 272

Tsesevich, Vladimir Platonovich, Corresponding Member AN Ukr SSR

Astronomicheskiye problemy Mezhdunarodnogo geofizicheskogo goda (Problems of Astronomy During the International Geophysical Year) Moscow, Izd-vo "Znaniye", 1957. 39 p. (Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy. Seriya VIII, 1957, no. 48) 50,000 copies printed.

Ed.: Fedynskiy, V. V., Professor; Ed. of Publishing House: Uspenskaya, N. V.; Tech. Ed.: Gubin, M. I.

PURPOSE: The booklet is intended to acquaint the general public with some of the problems to be investigated during the International Geophysical Year, especially those related to astronomical observations, and it gives some idea of the important work facing astronomers during 1957-58 in connection with IGY program.

COVERAGE: The booklet describes the problems and objectives of the current international Geophysical Year in relation to astronomy. It discusses the

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Problems of Astronomy During the International Geophysical Year (Cont.)

structure and properties of the earth's lithosphere, hydrosphere and atmosphere as investigated by means of astronomical observations. The methods to be used include: study of meteors, interplanetary flight, artificial satellites and solar activity. The basic problem of the IGY program on solar research is to determine relationships between phenomena occuring in the sun and those occurring in the earth's atmosphere and in the earth itself, i.e., magnetic storms, auroras, and distrubances in the radio signals due to change in the ionosphere. To carry out these investigations the USSR has expanded its facilities as follows: 1. Installed a large horizontal solar telescope at Pul'kovo 2. Constructed a large vertical solar telescope at the Crimea Astrophysical Observatory 3 Organized two high altitude stations, one in the Caucasus near Kislovodsk and the other in Central Asia near Alm-Ata, to study the solar corona 4. Built Supplementary solar substations in L'vov, Central Sibera and the Far East in order to carry on continious observations at various longitudes. With respect to equipment, instrument capacity and program these observatories are inferior to the Pul'kovo and Crimean observatories as their work is of a supplementary nature 5. In addition to the two main meteor observatories in Stalinabad and Ashkhabad, new astronomical observatories have been built near Kiyev, one near Odessa on the banks of the Dnestr, and the other on the shore of the Bay of Odessa.

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FEDYNSKIY, V. V.

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Vsesoyuznyy nauchno-issledovatel'skiy institut geofizicheskikh metodov razvedki

Prikladnaya geofizika; sbornik statey, vyp. 16 (Applied Geophysics; Collection of Articles, Nr 16) Leningrad, Gostoptekhizdat [Leningradskoye otdeleniye] 1957. 241 p. 3,000 copies printed.

Ed.: Fedynskiy, V. V.; Managing Ed.: Fedotova, M. I.; Tech. Ed.: Yashchurzhinskaya, A. B.

PURPOSE: This collection of 17 articles is published for geophysicists, oil geologists and others interested in the methods and practices of geophysical prospecting for oil.

COVERAGE: The articles discuss the theory and practice of seismic exploration, the resolving capacity of Soviet equipment, increased revolving capacity in electrical exploration, gravity and magnetic methods of exploration and oil-well logging.

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TOPCHIYEV, A.B., akademik, redaktor; TROFIMUK, A.A., redaktor; TREBIN, F.A. doktor tekhnicheskikh nauk, redaktor; FEDYNSKIY, V.V., doktor fiziko-matematicheskikh nauk, redaktor; SUKHANOV, V.P., inzhener, redaktor; L'VOV, LA.A., vedushchiy redaktor; POLOSINA, A.S., tekhnicheskiy redaktor.

[The Fourth International Petroleum Congress] IV Mezhdunarocnyi neftianoi kongress. Moskva, Gos.nauchno-tekhn.izd-vo neft. i gorno-toplivnoi litry. Vol. 7. [The use of petroleum products] Primenenie nefteproduktov, 1957. 619 p. (MLRA 10:5)

1. International Petroleum Congress. 4th, Rome, 1955. 2.Chleny delegatsii SSSR na IV Mezhdunarodnom neftyanom kongresse (for Topchiyev,Trofimuk, Trebin, Fedynskiy, Sukhanov)
(Petroleum industry)

FEDYNSKIY, V.V.

Meteor observations. Mezhdunar. geofiz. god no.3:55-62 '57. (MIRA 11:5)
(Meteors)

BOGDANOV, A.I.; DYUKOV, A.I.; FEDYNSKIY, V.V.

Geophysical methods used in the U.S.S.R. in prospecting for mineral resources. Sov. geol. no.60:143-164 '57. (MIRA 11:3)

1. Moskovskiy institut tsvetnykh metallov i zolota im. M.I. Kalinina i Ministerstvo geologii i okhrany nedr SSSR.
(Prospecting--Geophysical methods)

FEDYNSKIY, V.V.

Wavy motions of noctilucent clouds. Astron. tsir. no.181:25-26 Je '57. (MIRA 13:3)
(Clouds)

FEDYNSKIY, V.V.

Geophysical methods of prospecting for oil and gas fields in the sixth five-year plan. Geol. nefti 1 no.1:5-11 Ja '57. (MLRA 10:8)
(Prospecting--Geophysical methods)
(Petroleum geology) (Gas, Natural--Geology)

BOGDANOV, A.I.; KOMAROV, S.G.; FEDYNSKIY, V.V.

Geophysical methods of prospecting for oil and gas in the U.S.S.R.
Geol.nefti 1 no.11:13-30 N '57. (MLRA 10:9)
(Prospecting--Geophysical methods)

FEDYNSKIY, V.V.

MAGNITSKIY, V.A.; FEDYNS'KIY, V.V.

Geophysical problems at the 22d session of the International Geological Congress in Mexico. Vest. Mosk. un. Ser. biol., pochv., geol., geog. 12 no.1:25-34 '57. (MIRA 10:11)
(Mexico (City)--Geophysics--Congresses)

GAL'PERIN, Ye.I., GORYACHEV, A.V., ZVEREV, S.M., FEDYNSKIY, V.V., doktor ... fiziko-matematicheskikh nauk, otv. red.; SILKIN, B.I., red., izd-va,; RYLINA, Yu.V., tekhn. red.

[Studies on the structure of the Earth's crust in the transition region from the Asiatic continent to the Pacific; work of the Pacific geological and geophysical expedition of the Academy of Sciences of the U.S.S.R.] Issledovanie zemnoi kory v oblasti perekhoda ot Aziatskogo kontinenta k Tikhomu okeanu; raboty Tikhookeanskoi kompleksnoi geologo-geofizicheskoi ekspeditsii AN SSSR v 1957 g. Moskva, Izd-vo Akad. nauk SSSR. No. 1.[Twelfth section of the International Geophysical Year program(seismology)] XII razdel programmy MGG (seismologiia) 1958. 25 p. (MIRA 11:10)
(International Geophysical Year, 1957-1958)
(Seismology--Observations)
(Soviet Far East--Geology)

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Vsesoyuznoye astronomo-geodezicheskoye obshchestvo

Astronomicheskiy kalendar; yezhegodnik. Peremennaya chast'; 1959 (Astronomical Calendar; Yearbook. Variable Part; 1959) Moscow, Fizmatgiz, 1958. 370 p. 8,500 copies printed.

Ed.: I.Ye. Rakhlin; Tech. Ed.: S.N. Akhlamov; Editorial Board: P.I. Bakulin (Resp. ed.), S.G. Kulagin, A.G. Masevich, and P.P. Parenago.

PURPOSE: This astronomical calendar is intended for specialists in astronomy, astrophysics, and geophysics.

COVERAGE: The book is divided into two parts. The first, based on data taken from the USSR Astronomical Yearbook for 1959, consists of ephemerides and accompanying text, compiled and written by the following specialists: S.G. Kulagin and L.D. Kovbasyuk of the GAGO (State Astronomical and Geodetical Society) - notes on ephemerides, the ephemerides of the Sun and Moon; M.M. Dogayev of the MOVAGO (Moscow Branch of the All-Union Astronomical and Geodetic Society) - text and maps of the visible trajectories of the planets, text and maps of eclipses, the physical coordinates

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of the Sun, Moon, Mars, and Jupiter, the satellites of Jupiter and Saturn; N.D. Rozenblyum (MOVAGO) - emphemerides and heliocentric longitudes of planets; I.F. Yegorchenko, A.A. Kaverin, T.G. Konstantinova, V.A. Kuklina, G.V. Kuklin, Z.G. Sazonova, L.I. Chernykh, and N.S. Chernykh - data on 144 points in the USSR for the full solar eclipse of October 2, 1959; Ye.G. Demidovich (GAGO) - occultation of the stars and planets by the Moon, observation of the Polar Star, computation of stellar coordinates; V.A. Bronshteyn (MOVAGO) - comets; N.S. Yakhontova - the lesser planets; and, N.B. Perova (MOVAGO) - variable stars. The second part, the Supplement, contains a review of the achievements in astronomy for the years 1956 and 1957, written by V.A. Bronshteyn, O.D. Dokuchayeva, L.A. Katasev, M.A. Klyakotko, P.P. Parenago, and I.S. Shcherbina-Samoylova under the editorship of A.G. Masevich, articles on artificial satellites, the danger in astronautics from meteors, the nature of galaxies, articles on scientific meetings held in the Soviet Union and abroad, and articles on the anniversaries of events in astronomy. The book is profusely illustrated with tables, maps, photographs, and diagrams. The Supplement includes some 125 Soviet references grouped according to subject matter and type of publication.

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PART II. SUPPLEMENTS